

REMARKS

Claims 1-4, 6-11, 13, 14 and 16-22 are pending in the present application.

Claims 1, 14, 16 and 19 have been amended. Claims 21 and 22 have been presented herewith.

Claim Rejections-35 U.S.C. 103

Claims 1-3, 6-11 and 13-18 have been rejected under 35 U.S.C. 103(a) as being unpatentable over the Ochiai reference (U.S. Patent No. 6,043,526) in view of the Basceri et al. reference (U.S. Patent No. 6,444,478). This rejection, insofar as it may pertain to the presently pending claims, is traversed for the following reasons.

The ferroelectric capacitor of claim 1 features in combination that "a distance between the bottom electrode and the top electrode at the first region is greater than a distance between the bottom electrode and the top electrode at the second region". Applicant respectfully submits that these features would not have been obvious in view of the prior art as relied upon by the Examiner for at least the following reasons.

The Examiner has interpreted projection 21 and lower electrode layer 23 in Fig. 3 of the Ochiai reference collectively as the bottom electrode of claim 1. The Examiner has further interpreted upper electrode 26 in Fig. 3 of the Ochiai reference as the top electrode of claim 1. However, since upper electrode 26 in Fig. 3 of the Ochiai reference is shown as formed conformally over lower electrode layer 23 and column shaped projection 21 (lower electrode 24), the capacitor structure in Fig. 3 of the Ochiai

reference does not feature that a distance between the bottom electrode and the top electrode at a first region is greater than a distance between the bottom electrode and the top electrode at a second region, as would be necessary to meet the features of claim 1. That is, the distance between upper electrode 26 and lower electrode 24 in Fig. 3 of the Ochiai reference is uniformly constant. The Basceri et al. reference as secondarily relied upon by the Examiner fails to overcome this deficiency. Applicant therefore respectfully submits that a ferroelectric capacitor of claim 1 would not have been obvious in view of the prior art as relied upon by the Examiner taken singularly or together, and that this rejection, insofar as it may pertain to claims 1-3 and 6-9, is improper for at least these reasons.

The ferroelectric capacitor of claim 10 features in combination that "a distance between the bottom electrode and the top electrode at the step area is greater than a distance between the bottom electrode and the top electrode at a central area of the ferroelectric capacitor".

Applicant respectfully submits that these features would not have been obvious in view of the prior art as relied upon by the Examiner for at least somewhat similar reasons as set forth above with respect to claim 1. Applicant therefore respectfully submits that the ferroelectric capacitor of claim 10 would not have been obvious in view of the prior art as relied upon by the Examiner taken singularly or together, and that this rejection of claims 10, 11 and 13 is improper for at least these reasons.

The semiconductor device of claim 16 includes a ferroelectric capacitor that

features in combination "a distance between the bottom electrode and the top electrode at the first region is greater than a distance between the bottom electrode and the top electrode at the second region". As noted above, the prior art as relied upon by the Examiner does not disclose or make obvious these features. Applicant therefore respectfully submits that the semiconductor device of claim 16 would not have been obvious in view of the prior art as relied upon by the Examiner taken singularly or together, and that this rejection, insofar as it may pertain to claims 16-18, is improper for at least these reasons.

Claims 19 and 20 have been rejected under 35 U.S.C. 103(a) as being unpatentable over the Ochiai reference and the Basceri et al. reference, in further view of the Kobayashi reference (U.S. Patent No. 6,495,879). This rejection is respectfully traversed for the following reasons.

The semiconductor device of claim 19 includes a ferroelectric capacitor that features in combination "a distance between the bottom electrode and the top electrode at the first region is greater than a distance between the bottom electrode and the top electrode at the second region". As noted above, the prior art as primarily relied upon by the Examiner does not disclose or make obvious these features. The Kobayashi reference as secondarily relied upon by the Examiner also fails to disclose or make obvious these features. Applicant therefore respectfully submits that the semiconductor device of claim 19 would not have been obvious in view of the prior art as relied upon by the Examiner taken singularly or together, and that this rejection, insofar as it may

pertain to claims 19 and 20, is improper for at least these reasons:

Allowable Subject Matter

Applicant respectfully notes the Examiner's acknowledgment that claim 4 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form. Applicant however respectfully submits that claim 4 should be allowable by virtue of dependency upon claim 1, and that further amendment of claim 4 to be in independent form is therefore unnecessary.

Claims 21 and 22

The ferroelectric capacitor of claim 21 includes a central area and a peripheral area, and includes in combination a bottom electrode; a top electrode; a ferroelectric layer which is arranged between the top electrode and the bottom electrode; and a dielectric layer "which is arranged between the bottom electrode and the top electrode at a peripheral area of the ferroelectric capacitor, so that an electrode field strength at the peripheral area of the ferroelectric capacitor is lower than an electric field strength at a central area of the ferroelectric capacitor".

The Examiner has relied upon the Basceri et al. reference to provide a teaching of forming a dielectric layer comprising two dielectric layers. The Examiner has apparently suggested modifying the Fig. 3 structure of the Ochiai reference to replace or modify capacitor insulator 25 to somehow include layer 12 in Fig. 1 of the Basceri et

al. reference. Although Applicant does not necessarily agree that proper motivation has been established to modify the Fig. 3 structure of the Ochiai reference, since both capacitor insulator layer 25 in Fig. 3 of the Ochiai reference and layer 12 in Fig. 1 of the Basceri et al. reference have uniform thickness, modification of the Fig. 3 structure of the Ochiai reference in view of the Basceri et al. reference would not include a dielectric layer arranged so that an electric field strength at a peripheral area of the ferroelectric capacitor is lower than an electric field strength at a central area of the ferroelectric capacitor, as would be necessary to meet the features of claim 21. Applicant therefore respectfully submits that claims 21 and 22 distinguish over and would not have been obvious in view of the prior art as relied upon by the Examiner taken singularly or together for at least these reasons.

Conclusion

The Examiner is respectfully requested to reconsider and withdraw the corresponding rejections, and to pass the claims of the present application to issue, for at least the above reasons.

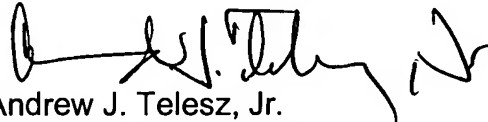
Pursuant to the provisions of 37 C.F.R. 1.17 and 1.136(a), the Applicant hereby petitions for an extension of one (1) month to October 15, 2005, for the period in which to file a response to the outstanding Office Action. The required fee of \$120.00 should be charged to Deposit Account No. 50-0238.

In the event that there are any outstanding matters remaining in the present application, please contact Andrew J. Telesz, Jr. (Reg. No. 33,581) at (571) 283-0720 in the Washington, D.C. area, to discuss these matters.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment for any additional fees that may be required, or credit any overpayment, to Deposit Account No. 50-0238.

Respectfully submitted,

VOLENTINE FRANCOS & WHITT, P.L.L.C.

A handwritten signature in black ink, appearing to read "Andrew J. Telesz, Jr.", with a stylized flourish at the end.

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